



US006408151B1

(12) **United States Patent**  
Heno

(10) Patent No.: **US 6,408,151 B1**  
(45) Date of Patent: **Jun. 18, 2002**

(54) **CARD CLEANING DEVICE**

(75) Inventor: **Gaetan Heno, Ancenis (FR)**

(73) Assignee: **ZIH Corp., Wilmington, DE (US)**

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/010,222**

(22) Filed: **Dec. 6, 2001**

#### Related U.S. Application Data

(63) Continuation of application No. 09/822,692, filed on Mar. 30, 2001, which is a continuation-in-part of application No. 09/483,624, filed on Jan. 13, 2000, now Pat. No. 6,285,845.  
(60) Provisional application No. 60/133,578, filed on May 11, 1999.

(51) Int. Cl.<sup>7</sup> ..... **G03G 15/00; A46B 15/00**

(52) U.S. Cl. .... **399/107; 15/256.51**

(58) Field of Search ..... **399/107, 123, 399/124, 361, 381, 390; 347/171; 400/701; 15/3, 102, 256.51, 256.52**

(56) **References Cited**

#### U.S. PATENT DOCUMENTS

4,009,047 A \* 2/1977 Lindsay ..... 15/256.52 X

4,982,469 A \* 1/1991 Nishiwaki ..... 15/102 X

5,989,358 A \* 11/1999 Korbonski ..... 15/256.52 X

\* cited by examiner

*Primary Examiner*—Sophia S. Chen

*Assistant Examiner*—Hoan Tran

(74) *Attorney, Agent, or Firm*—Fulbright & Jaworski L.L.P.

(57) **ABSTRACT**

A card cleaning device for use in an image forming machine includes a frame adapted for installation into an appropriately configured image forming machine, a bottom card cleaning roller having a shaft removably coupled to the frame and adapted for cleaning a card being fed at an angle relative to the frame and a top adhesive roller coupled removably to the frame on top of the bottom roller for continuous cleaning of the bottom roller by means of friction during device operation. The cards are being fed one at a time at an angle relative to the frame to save internal printer space by a card feeder mechanism disposed proximate to the card cleaning device with the entering end of each card being slightly bent upon first card contact with a pair of card entry guides or a card entry guide plate coupled to the frame under the bottom roller so as to enable card feeding at an angle and prevent premature wear of the bottom card cleaning roller.

**15 Claims, 25 Drawing Sheets**

